

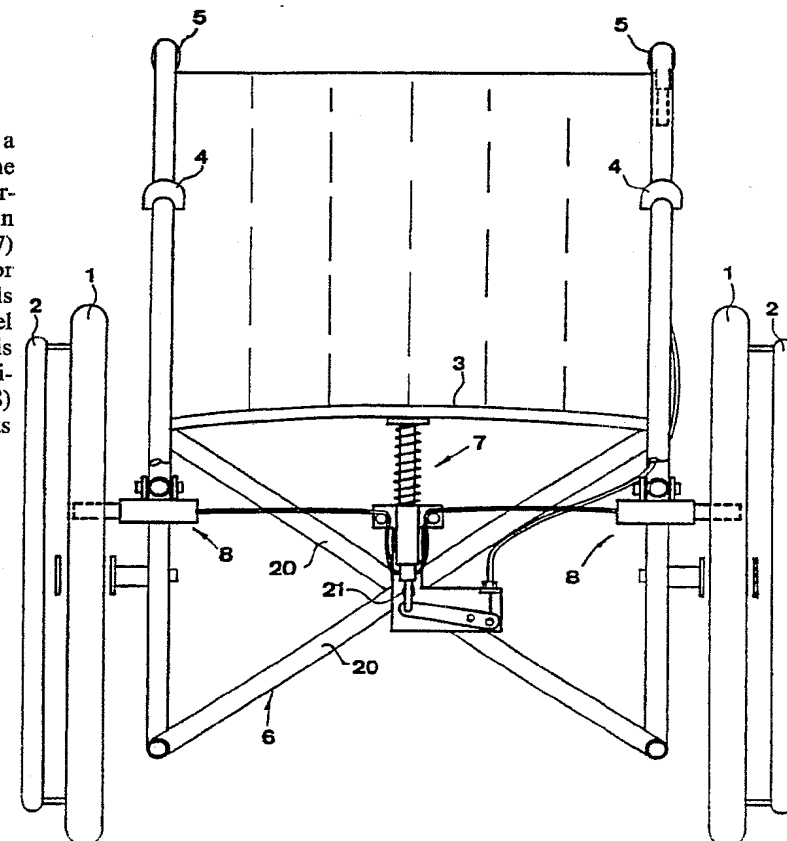


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/SE90/00347 (22) International Filing Date: 23 May 1990 (23.05.90) (30) Priority data: 8901817-0 23 May 1989 (23.05.89) SE (71) Applicant: HÅLÉN, Åke [SE/SE]; Stenbäcken 2100, S-816 00 Ockelbo (SE). (72) Inventor: SANDMARK, Inge ; Apelgatan 27, S-802 56 Gävle (SE). (74) Agent: BJERKÉN, Jarl, Håkan; Bjerkéns/Gävle Patentbyrå AB, Box 304, S-801 04 Gävle (SE).		(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent)*, DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), SE (European patent). Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: A DEVICE IN WHEEL CHAIRS**(57) Abstract**

A device in wheel chairs having wheels (1), a seat (3) and an arrangement (8) to block or brake the wheels against rotation comprises a detecting arrangement (7) to detect whether a person is sitting in the wheel chair or not. The detecting arrangement (7) is adapted to automatically operate the blocking or braking arrangement (8) to block or brake the wheels against rotation when a person rises from the wheel chair. Furthermore, the detecting arrangement (7) is preferably, but not necessarily, adapted to automatically operate the blocking or braking arrangement (8) to release the wheels for rotation when a person sits down in the wheel chair.



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A device in wheel chairs

FIELD OF INVENTION AND PRIOR ART

This invention is related to device in wheel chairs of the kind defined in the preamble of claim 1.

Such a device is disclosed in US 3 529 700. In figs 1-3 in the US patent an embodiment is described, in which rigid rods are secured on the lower side of a wheel chair seat. These rods are by means of traction elements connected to braking members arranged to co-operate with the tires of the wheel chair. Springs are provided to actuate the braking members into a braking position. The traction elements, braking members and springs are located on a level above the seat of the wheel chair and more specifically in the area behind the back support of the wheel chair and they are at that location disquietingly well exposed to inadvertent influence which may cause risks for operational disturbances or even distortion of the inherent components. In figs 4-6 in the US patent an alternative embodiment is described, wherein the chassis portions hingedly connected to each other in the middle region of the wheel chair operate as detecting components on loading of the seat of the wheel chair. The lower ends of the chassis portions are displaceably received in slots against the action of springs under influence of a person sitting on the seat of the wheel chair. Displacement downwardly of the chassis portions in the slots, give, via traction elements in the form of rods, rise to a braking rotation of braking members. The disadvantage of this embodiment is that it necessitates a relatively costly special design of the wheel chair since the vertical chassis elements thereof must be provided with the slots and furthermore the springs must be arranged within the chassis elements. This

means accordingly that the wheel chair must be prefabricated with specific intention of being provided with the device in view. Furthermore, it is a disadvantage that the scissorslike and mutually hingedly connected chassis portions are displaceably received in the slots relative to the chassis elements, since this relative mobility deteriorates the stability of the wheel chair in its erected position; at least some clearance would namely have to be provided between the chassis portions and the slots. The embodiment illustrated in figs 7 - 9 in the US patent suffers from generally the same disadvantages as those discussed hereinabove with regard to the embodiment according to figs 4 - 6.

SUMMARY OF THE INVENTION

The object of the present invention is to develop the prior art reflected in the preamble of claim 1 in such a way that the detecting arrangement becomes mountable on a wheel chair in a readily realizable manner independently of whether such mounting occurs in connection with original manufacturing of the wheel chair or at an arbitrary point of time thereafter, it being in particular intended that the detecting arrangement by means of the mounting in view should obtain a suitable position for the operation intended, in which position the detecting arrangement is located relatively well protected from inadvertent damaging or interfering influence.

This object is in according to the invention obtained in that a base portion of the detecting arrangement is rotatably connected by means of the axis enabling folding of the chassis portions. This axis is necessarily located under the seat of the wheel chair and the location of the detecting arrangement obtained thereby becomes excellent from all points of view, namely relatively well hidden under the seat and exposed to damages to a minimum degree. Furthermore, it is technically very simple to mount the detecting arrangement by means of the axis. Finally, the rotatable mounting of the detecting

arrangement means that it will not influence in a negative manner the folding of the wheel chair which is aimed at by relative rotation of the chassis portions about the axis.

Preferable detail designs of the device according to the invention are subject matter of the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

With reference to the enclosed drawings, a more specific description of an embodiment example of the invention will follow hereinafter.

In the drawings:

fig 1 is a diagrammatical view from the front of a conventional wheel chair provided with the device according to the invention;

fig 2 is an enlarged view illustrating the details essential for the device according to the invention in an other operational state.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

The wheel chair illustrated in fig 1 comprises two main wheels 1, which in practice may be those wheels, by means of which a person sitting in the wheel chair may displace the wheel chair by manual actuation. Such displacement is simplified by means of special operating rims 2. Furthermore, the wheel chair comprises a seat 3, arm rests 4 for a person sitting in the wheel chair and rearwardly directed handles, by means of which an assisting person walking behind the wheel chair may displace the same with or without a person sitting in the wheel chair. The wheel chair comprises a chassis denoted 6 and has normally one or more additional support wheels not illustrated in the drawings.

The device according to the invention comprises a detecting arrangement 7 to detect whether a person is sitting in the wheel chair or not and this detecting arrangement is adapted to automatically operate a blocking or braking arrangement 8 to block or brake the wheels 1 against rotation when a person rises from the wheel chair. Furthermore, it is preferred that the detecting arrangement 7 is adapted to automatically operate the blocking or braking arrangement 8 to release the wheels 1 for rotation when a person sits down in the wheel chair.

The blocking or braking arrangement 8 comprises in the embodiment for each of at least two of the wheels, i.e. the wheels denoted 1, a blocking or braking member 9. Furthermore, these members 9 are here so designed that they have a purely blocking function. More specifically, the blocking members 9 are adapted to project, in their wheel blocking positions, into cavities in the wheels located internally of the tires or rims of the wheels to disable the wheels for any rotation worth mentioning by contacting edges of these cavities. In practice, these cavities are formed by spaces between wheel spokes.

The detecting arrangement 7 is adapted to detect whether the seat 3 is loaded or actuated by a person or not. More specifically, the detecting arrangement 7 comprises at least two members movable relative to each other, namely a detecting member 10 adapted to be displaced relative to the second member 11, which is connected to the chassis 6 of the wheel chair, by actuation of the seat 3 of the wheel chair when a person sits down thereon.

The detecting member 10 is by means of a spring 12 actuated into contact with the lower side of seat 3. The seat 3 is in a manner known per se formed by a flexible material portion, for instance a web or the like. The spring 12 is dimensioned so that it is capable of actuating, when a person is not sitting on the seat 3, the detecting member 10 to displace at least a portion of the seat 3 upwardly relative to the position of the

seat portion when it is loaded by a person. This appears from fig 1, where it is possible to see that the detecting member 10 actuates the seat 3 so that it is located in a higher position, as far as its middle portion is concerned, than in the situation according to fig 2, which is intended to indicate the downwardly actuated position of the seat under influence of a person sitting on the upper side of the seat.

Each of the blocking members 9 of the blocking arrangement 8 is by means of a power transmission connected to the detecting arrangement 7 to obtain an operating movement therefrom and via the power transmission 13. Each of the power transmissions 13 is connected to the movable detecting member 10. The power transmissions are in practice formed by a single or alternatively by two tensile force transmitting elements of a flexible design. As an example, it may be the question of lines or wires. In the embodiment according to fig 2 it is illustrated that a single line or wire forms the two transmissions 13 by the ends of the line or wire being secured to the two blocking members 9, whereas the line or wire between its ends is secured to the detecting member 10 at the location denoted 14. More specifically, the line or wire may there extend through a transverse aperture in the detecting member 10 and securing of the line or wire against displacement along this aperture may be obtained by means of a blocking screw extending transversely to the aperture in a manner well-known per se.

Each of the blocking members 9 is by means of a spring 15 actuated to a wheel blocking position, this position being illustrated in fig 1. The force of this spring 15 may be overcome by traction produced in the tensile force transmitting element 13 by the detecting member 10. As appears from fig 2 the blocking member 9 is formed by a pistonlike body reciprocatingly displaceable within a cylinder 16 secured to the chassis of the wheel chair in a suitable manner relative to the wheel in question, i.e. so that the cylinder 16 is located at the side of the wheel but so that the blocking member 9 on

extensioning out of the cylinder may enter in between the spokes of the wheel. The spring 15, which suitably is designed as a compression spring acting between the bottom of the cylinder 16 and the blocking member 9, tends accordingly to actuate the blocking member 9 in an outwardly projecting direction. The tensile force transmitting element 13 passes to securing engagement with the blocking member 9 through a hole in the bottom of the cylinder 16 and through the compression spring 15 designed as a helical spring.

The detecting member 10 has in the embodiment the character of a rod displaceable in a sleeve 11, said rod contacting the lower side of the seat 3 by means of a first end or members associated therewith, e.g. a contact plate. The fixation of the tensile force transmitting element 13 relative to the rod 10 at the location denoted 14 takes place in the area of the opposite end of the rod. The tensile force transmitting element 13 runs from the fixation location 14 to the blocking member 9 in question via a diverting member 18. These diverting members are arranged connected to the sleeve 11 and more specifically on a plate or the like 19 forming a base of the detecting arrangement 7.

As appears from the drawings, the detecting member 10 is movable in a generally vertical direction of movement whereas blocking members 9 move generally horizontally. The diverting members 18 are arranged at generally the same level as blocking members 9 so that in practice the tensile force transmitting element 13 extend in a generally horizontal plane between the respective diverting member 18 and the respective blocking member 9. On the contrary, the parts in question of the tensile force transmitting element extend, between the diverting members 18 and the fixation location 14 relative to the detecting member 10, in directions forming an angle, suitably nearly right angles to horizontal planes. The fixation point 14 is more specifically arranged at a level substantially below the blocking members and diverting members 18.

If two separate tensile force transmitting elements are arranged, one for each of the blocking members 9, it should be understood that both of these are secured relative to detecting member 10 in the area of the indicated fixation point 14.

The wheel chair illustrated herein is intended to comprise a foldable chassis 6, which enables folding of the wheel chair so that wheels 1 move towards each other while maintaining a generally parallel relation. Chassis portions 20 extending crosswise in the unfolded position of the wheel chair then rotate about a horizontal axis 21 arranged in the middle of the wheel chair and extending parallel to the planes of the wheels 1. The chassis portions 20 assume, in the folded position, a generally vertical, mutually parallel relation. It is preferred that the base portion 19 of the detecting arrangement is rotatably secured about the axis 21 enabling folding of the chassis portions 20. The device may then be such that base part 19 and accordingly detecting member 10, sleeve 11 and diverting members 18 are freely rotatable about axis 21 irrespective of the influence from the tensile force transmitting element or elements 13. This latter influence is then such that the tensile force transmitting element parts 13 belonging to each of the blocking members 9 exerts a holding influence on the base portion 19 via the diverting members 18 so that the base portion 19 is maintained in such a position that the detecting member 10 is located in an active operational position, i.e. in the embodiment exemplified, extends generally vertically. In order to obtain this mode of operation, the length of movement of the detecting member 10 between the positions according to figs 1 and 2 should be generally equally great as the total length of movements of the blocking members 9 in that the latter for obtaining blocking move in directions away from each other.

It is not necessary that the tensile force transmitting elements 13 form means for maintaining the detecting arrangement 7 in its active operational position about axis 21 when the wheel

chair is unfolded for transporting a person. Such means could instead have the character of a yoke, the yoke shanks of which would extend generally parallel to axis 21 and embrace the parts of the chassis portions 20 in the area of the axis 21 so that the yoke shanks when the wheel chair is unfolded are actuated by the chassis portions 20 so that the detecting arrangement 7 forcefully is moved into its active operational position according to figs 1 and 2. This yoke may preferably be integrated with the base portion 19 of the detecting arrangement 7 in a rigid manner, the yoke shanks suitably being formed by arms or the like rigidly projecting away from the base portion.

According to a preferred embodiment of the invention the axis 21 may suitably be formed by an axle pin rigidly attached to the base portion 19 of the detecting arrangement 7, said axle pin protruding through holes in the chassis portions 20. However, the axis 21 may also be formed by a separate axle pin protruding through also a hole in the base portion 19 of the detecting arrangement 7.

It is at times required to displace the wheel chair without a person sitting therein. Such displacement is then as a rule carried out by an assisting person by means of the rearwardly directed handles 5. However, it appears from the description above that blocking members 9 will block wheels 1 against rotation as long as a person is not sitting in the wheel chair. In order to deal with this problem, the device comprises an operating member 22, suitably arranged in connection with one of the rearwardly directed handles 5, said operating member being connected to the blocking members 9 of the blocking arrangement to enable operation of the blocking members 9 for releasing the wheels for rotation when the seat 3 of the wheel chair is not loaded by a person. The operating member 22 is more specifically adapted to actuate, via a transmission 23, the contact member 10 in the same direction as the actuation which occurs when a person sits down on the seat 3.

In the embodiment, the transmission 23 comprises an operating cable 24 of Bowden type, i.e. the cable 24 is surrounded by an envelope 25. The cable 24 extends between operating member 22 which may be a pivotably moveable handle, and a lever 26, which is connected to the detecting rod 10 by means of a connection member 27, e.g. a flexible tensile force transmitting member or a link, which is hinged relative to the lever 26 and detecting rod 10. The lever 26 may have two arms so that the cable 24 acts at the extreme end of one arm of the lever whereas the connection member 27 adjoins to the extreme end of the second arm of the lever. The lever 26 is rotatably supported at a side protection of base portion 19 about an axis 28. The base portion 19 also carries a connection member 29 for the envelope 25 of the cable 24.

The device according to the invention operates in the following way: when a person is not sitting in the wheel chair, the components of the device assume the position according to fig 1, i.e. the detecting member 10 is under the influence of the helical compression spring 12 pushed upwardly into contact with the lower side of the seat 3 and the seat is displaced upwardly relative to its position under load. The springs 15 of detecting members 9 retain detecting members 9 projecting out of the cylinders 16 so that rotation of wheels 1 is prevented. When a person sits down in the wheel chair, seat 3 will be pressed downwardly towards the position according to fig 2. Thus, detecting member 10 is actuated downwardly and via the tensile force transmitting parts of element 13 detecting members 9 are drawn inwardly into cylinders 16. During this movement blocking members 9 pass the position, in which the respective wheel 1 is liberated for rotation. This liberation occurs suitably relatively late during the sitting down operation so that the wheels 1 are liberated for rotation not until such time where there is no longer any risk associated to the wheel chair being free to roll. The person may then in a conventional manner move himself by means of the wheel chair.

When the person rises from the wheel chair, his load on the seat 3 is removed, for what reason the compression spring 12 displaces detecting member 10 upwardly and at the same time blocking members 9 are allowed to move to a blocking co-operation with the wheels 1 under the influence of compression springs 15 by resilience of the tensile force transmitting element parts. As soon as the seat of the user has left the seat 3 of the wheel chair or somewhat before, the wheel chair is accordingly effectively prevented from rolling by means of blocking members 9.

By actuation of handle 22, detecting member 10 may be drawn downwardly also without load from a person on seat 3 and blocking members 9 may thereby be brought to their positions releasing the wheels and the wheel chair may be displaced. It is suitable that the handle 22 is located inaccessibly to a person sitting in the wheel chair so that this person cannot, inadvertently or due to absence of mind, actuate handle 22 during sitting down or rising.

It is suitable that the wheel chair, in addition to the blocking arrangement 8 described, is completed with a further braking device of the manually operable type so that the user during normal use may brake or release the wheels of the wheel chair at will.

Thanks to the rotatable arrangement of detecting arrangement 7 about axis 21, the detecting arrangement will be located in the middle area of the wheel chair below the seat. On folding of the wheel chair the detecting arrangement will not form any hindrance but remain in the middle area of the wheel chair while the chassis portions 20 are rotated relative to each other about axis 21 until they are located generally vertically with the wheels 1 fairly close to each other.

The invention is of course not only limited to the embodiment described. It is for instance not necessary that the detecting

arrangement 7 is in a direct mechanical power transmitting relation to the blocking or braking arrangement 8. Instead the detecting arrangement 7 could be arranged as a load detector of an arbitrary type, e.g. mechanical, electrical or electronical, coordinated with the seat 3 to detect the load thereon and this detecting arrangement could be arranged to control, in an electrical, pneumatical, hydraulical or other suitable way, a separate power exerting device, e.g. a motor driven device, which produces operation of the blocking members 9 between their blocking and releasing positions respectively. For the rest it is not necessary that the detection arrangement 7 is of a load detecting type. Thus, it would be possible to design the detecting arrangement 7 as a touchfree detector, e.g. a photo cell which is so located that it establishes whether a person is sitting on the seat 3 or not. Furthermore, this detector should in an arbitrary manner control a suitable operating equipment to provide operation of blocking members 9. Also other modifications are possible within the scope of the invention.

Claims

1. A device in wheel chairs comprising a foldable chassis (6) with wheels (1), a seat (3) and an arrangement (8) to block or brake the wheels against rotation, chassis portions (20) extending crosswise in the unfolded state of the wheel chair being arranged to rotate, on folding of the wheel chair, about a horizontal axis (21) located in the middle of the wheel chair and extending parallel to the planes of the wheels (1), the device comprising a detecting arrangement (7) to detect whether a person is sitting in the wheel chair or not, said detecting arrangement (7) being adapted to automatically operate the blocking or braking arrangement (8) to block or brake, when a person rises from the wheel chair, the wheels (1) against rotation and suitably to release the wheels for rotation when a person sits down in the wheel chair,

c h a r a c t e r i z e d in that a base portion (19) of the detecting arrangement (7) is rotatably connected by means of the axis (21) enabling folding of the chassis portions (20).

2. A device according to claim 1,

c h a r a c t e r i z e d in that the detecting arrangement (7) is adapted to detect whether the seat is loaded or actuated by a person or not, that the detecting arrangement (7) comprises at least two members movable relative to each other, namely a detecting member (10) adapted to be displaced relative to the other member (11) which by means of the base portion (19) is connected to the chassis of the wheel chair, by actuation of the seat (3) of the wheel chair when a person sits down thereupon.

3. A device according to claim 2,

c h a r a c t e r i z e d in that the detecting member (10) by means of a spring (12) is actuated into contact with the lower side of the seat (3).

4. A device according to claim 3, characterized in that the seat (3) in a manner known per se is formed by a flexible material portion and that the spring (12) is dimensioned so that it is capable of actuating, when a person is not sitting in the wheel chair, the detecting member (10) to displace at least a portion of the seat upwardly relative to the position of the seat portion when loaded by a person.

5. A device according to any preceding claim, characterized in that the blocking or braking arrangement (8) comprises at least one blocking or braking member (9), which by means of a power transmission (13) is connected to the detecting arrangement (7) to obtain an operating movement from the detecting arrangement and via the power transmission, that the power transmission (13) is connected to the movable detecting member (10), that the power transmission (13) comprises a tensile force transmitting element and that the blocking or braking member (9) by means of a spring (15) is actuated towards its wheel blocking or wheel braking position, the detecting member (10) being adapted to overcome the force of this spring by producing traction in the tensile force transmitting element.

6. A device according to claim 5, characterized in that the detecting member has the character of a rod displaceable in a sleeve (11), said rod contacting the seat (3) from below by means of a first end or members associated therewith, that the tensile force transmitting element (13) is secured relative to the rod at its second end and runs to the blocking or braking member (9) via at least one diverting member (18).

7. A device according to any preceding claim, characterized in that it comprises an operating member (22), which is connected to the blocking or braking arrangement (8) to enable, when the seat (3) of the wheel chair

is not loaded by a person, operation of the blocking or braking arrangement to release the wheel for rotation.

8. A device according to claim 1,
c h a r a c t e r i z e d in that the blocking arrangement (8) comprises blocking members (9) adapted to project, in their wheel blocking positions, into cavities in the wheels located internally of the tires or rims of the wheels to disable the wheels to any rotation worth mentioning by contacting edges of these cavities.

9. A device according to claim 8,
c h a r a c t e r i z e d in that the cavities are formed by spaces between wheel spokes.

10. A device according to claim 8 or 9,
c h a r a c t e r i z e d in that the blocking member (9) is formed by a pistonlike body displaceable reciprocatingly within a cylinder (16) attached to the chassis of the wheel chair.

11. A device according to claim 10,
c h a r a c t e r i z e d in that the blocking member (9) by means of a spring (15), which preferably is designed as a compression spring acting between the bottom of the cylinder (16) and the blocking member, is actuated in a projecting direction towards a wheel blocking position.

12. A device according to claims 5 and 11,
c h a r a c t e r i z e d in that the tensile force transmitting element (13) runs into a securing engagement with the blocking member (9) through a hole in the bottom of the cylinder (16) and through the compression spring (15) designed as a helical spring.

13. A device according to any preceding claim,

c h a r a c t e r i z e d in that it comprises means to maintain the detecting arrangement (7) in an active operating position about the axis (21) when the wheel chair is unfolded.

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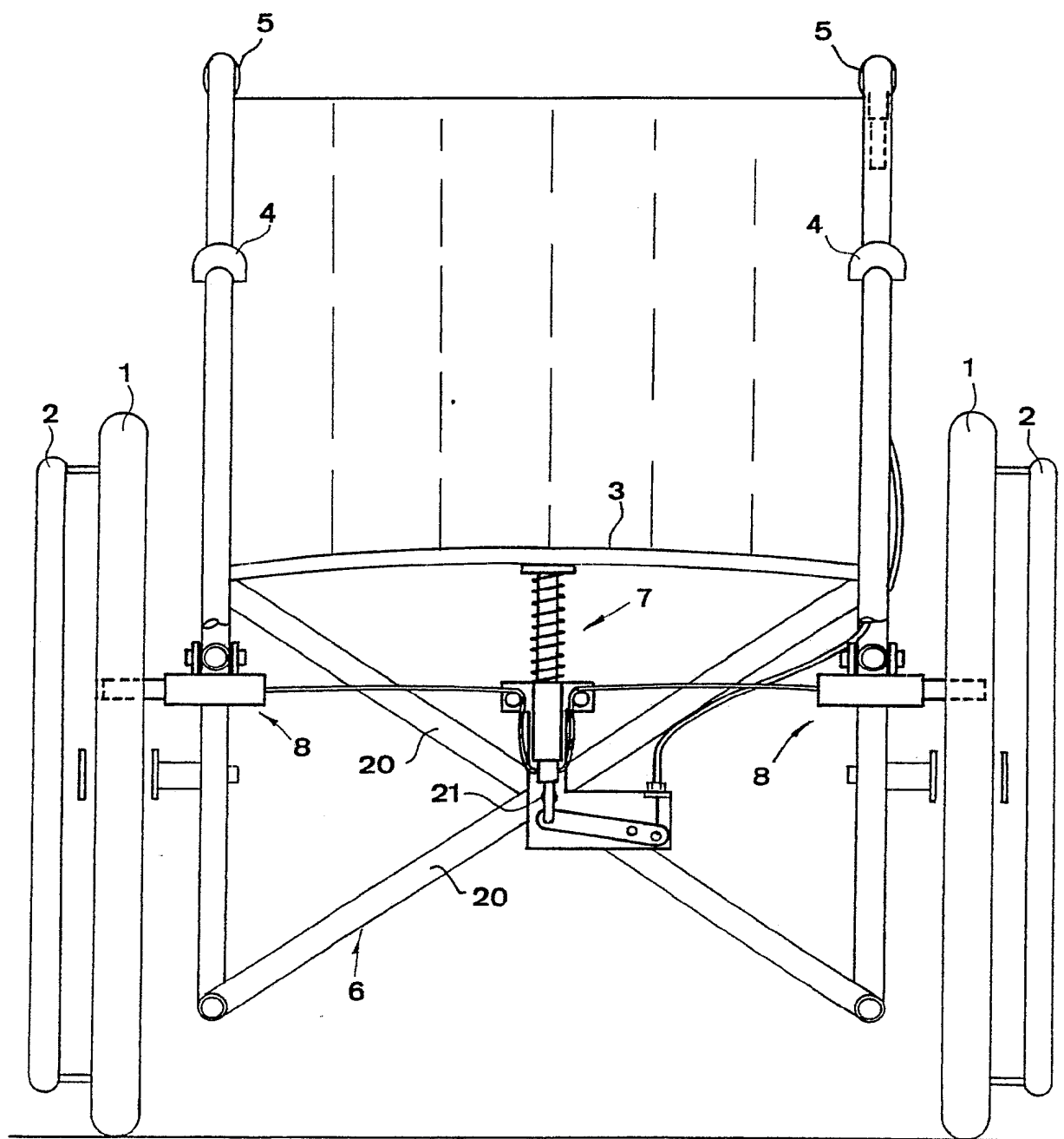
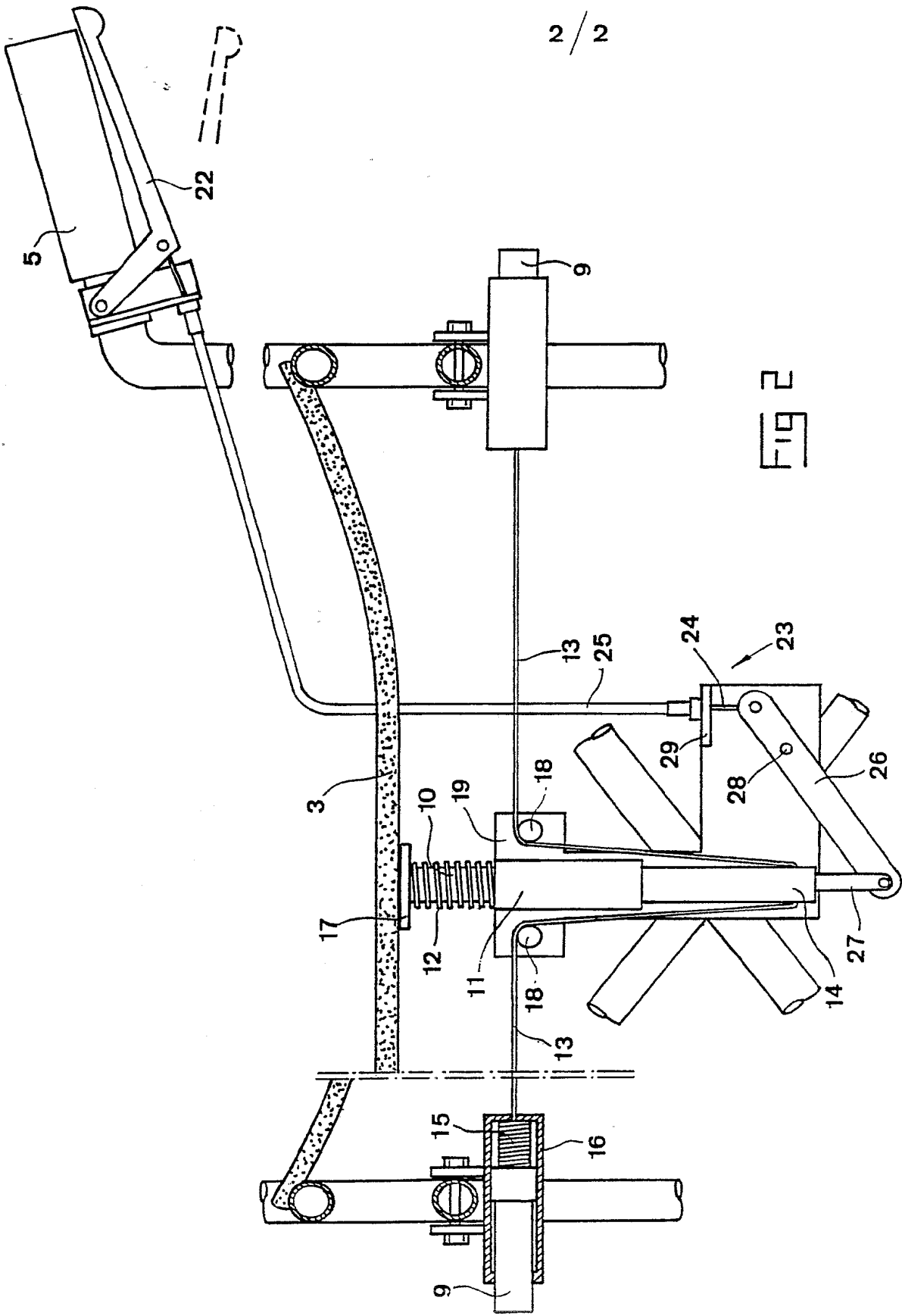


FIG 1



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 90/00347

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 61 G 5/00//B 60 T 1/04														
II. FIELDS SEARCHED <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Minimum Documentation Searched⁷</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border-bottom: 1px solid black;">Classification System</th> <th style="border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="height: 40px; vertical-align: bottom;">IPC5</td> <td style="vertical-align: bottom;">A 61 G; B 60 T</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched⁸</div> <p>SE,DK,FI,NO classes as above</p>			Classification System	Classification Symbols	IPC5	A 61 G; B 60 T								
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III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; border-bottom: 1px solid black;">Category *</th> <th style="border-bottom: 1px solid black;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 15%; border-bottom: 1px solid black;">Relevant to Claim No.¹³</th> </tr> <tr> <td style="vertical-align: top;">A</td> <td>US, A, 1141100 (OTTO E. BRAUN) 1 June 1915, see the whole document --</td> <td style="vertical-align: top;">1,2,5,7- 12</td> </tr> <tr> <td style="vertical-align: top;">A</td> <td>US, A, 3529700 (H.E. MARSHALL) 22 September 1970, see the whole document --</td> <td style="vertical-align: top;">1-5,7</td> </tr> <tr> <td style="vertical-align: top;">A</td> <td>US, A, 4084663 (HALEY) 18 April 1978, see figures 9-11 -- -----</td> <td style="vertical-align: top;">1,5,7- 11</td> </tr> </table>			Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	A	US, A, 1141100 (OTTO E. BRAUN) 1 June 1915, see the whole document --	1,2,5,7- 12	A	US, A, 3529700 (H.E. MARSHALL) 22 September 1970, see the whole document --	1-5,7	A	US, A, 4084663 (HALEY) 18 April 1978, see figures 9-11 -- -----	1,5,7- 11
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A	US, A, 4084663 (HALEY) 18 April 1978, see figures 9-11 -- -----	1,5,7- 11												
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents:¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>														
IV. CERTIFICATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black;">Date of the Actual Completion of the International Search</td> <td style="width: 50%; border-bottom: 1px solid black;">Date of Mailing of this International Search Report</td> </tr> <tr> <td style="text-align: center;">9th July 1990</td> <td style="text-align: center;">1990 -08- 0 8</td> </tr> <tr> <td style="border-bottom: 1px solid black;">International Searching Authority</td> <td style="border-bottom: 1px solid black;">Signature of Authorized Officer</td> </tr> <tr> <td style="text-align: center;">SWEDISH PATENT OFFICE</td> <td style="text-align: center;">Nils Andersson <i>Nils Andersson</i></td> </tr> </table>			Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	9th July 1990	1990 -08- 0 8	International Searching Authority	Signature of Authorized Officer	SWEDISH PATENT OFFICE	Nils Andersson <i>Nils Andersson</i>				
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 90/00347

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 90-05-24
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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